

REMARKS

This application has been carefully reviewed in light of the Office Action dated January 11, 2005. Claims 1 to 35 are in the application, of which Claims 1 and 19 are the independent claims. Claims 1 to 3, 5, 7, 19 to 21, 23 and 25 have been amended herein. Reconsideration and further examination are respectfully requested.

Initially, Claims 5, 7, 23 and 25 were amended herein, *sua sponte*, to correct minor editorial errors.

In the Office Action, the drawings were objected to under 37 C.F.R. § 1.83(a), for allegedly failing to show the feature of a step-cylinder horn antenna element, a dipole antenna element, a helical antenna element, a slot antenna element, a parabolic convex shape, a parabolic concave shape, an ellipsoidal convex shape, an ellipsoidal concave shape, a saddle shape, or an airfoil shape. In response, Applicants respectfully assert that such illustrations are not required.

While it is true that 37 C.F.R. § 1.83(a) requires drawings to “show every feature of the inventions specified in the claims,” it is also true that 37 C.F.R. § 1.81(a) only requires Applicants to “furnish a drawing of his or her invention *where necessary for the understanding of the subject matter sought to be patented.*” See 37 C.F.R. § 1.81(a) (emphasis added). In the case of the different antenna element types, Figures 4A and 4B clearly depict a generic-type antenna element 402, and the specific antenna element types cited by the Office Action are described throughout the disclosure, including paragraph [0046] of the specification. Given that the subject matter of the present invention relates to high-gain conformal antenna arrays, Applicants respectfully assert that one skilled in the art would not need to view a depiction of different types of well-known antenna element types, including step-cylinder horn antenna elements, dipole antenna elements, helical antenna elements, or slot antenna elements, to understand the substance of Claims 3 and 21.

Moreover, with regard to the non-planar shaped antenna array surface, specific shapes are also described throughout the disclosure, including paragraphs [0047] and [0048] of the specification, and Figures 4A, 4B, 5, 8A and 8B. Thus, and also for the reasons indicated above, Applicants further assert that one skilled in this highly technical art would not need to view a depiction of such a shape, such as parabolic convex or concave shape, an ellipsoidal convex or concave shape, a saddle shape, or an airfoil shape, in order to understand the subject matter of Claims 7 and 25, especially when the example convex spherical shape is described and illustrated in such great detail in the disclosure.

In light of the foregoing remarks, Applicants respectfully request reconsideration and withdrawal of all of the objections to the drawings.

Claims 1, 3, 21, and 35, which were rejected under 35 U.S.C. § 112, ¶ 2 for allegedly being indefinite, have been amended herein and, as such, reconsideration and withdrawal of the rejection are respectfully requested.

Claims 1 to 13 and 19 to 30 were rejected under 35 U.S.C. § 102(b) over European Patent Application No. 1 003 241 (“Rao”); and Claims 14 to 18 and 31 to 35 were rejected under 35 U.S.C. § 103(a) over Rao in view of U.S. Patent No. 6,404,404 (“Chen”). Reconsideration and withdrawal of the § 102 and § 103 rejections are respectfully requested.

The present invention generally relates to an antenna array system, including a plurality of antenna elements organized in an array and configured to form a non-planar shaped antenna array surface, and switching circuitry configured to switch each of the plurality of antenna elements on or off based on control signals. The antenna beam direction is steered in a first direction by switching on a first set of antenna elements. The antenna beam direction is steered in a second direction by switching on a second set of antenna elements.

The applied art is not seen to teach or suggest the features of the present invention. Specifically, the applied art is not seen to disclose at least the features of switching circuitry configured to switch each of the plurality of antenna elements on or off based on control signals, where the antenna beam direction is steered in a first direction by switching on a first set of antenna elements, and where the antenna beam direction is steered in a second direction by switching on a second set of antenna elements.

Referring to specific claim language, independent Claim 1 describes an antenna array system, including a plurality of antenna elements organized in an array and configured to form a non-planar shaped antenna array surface, and switching circuitry configured to switch each of the plurality of antenna elements on or off based on control signals. The antenna beam direction is steered in a first direction by switching on a first set of antenna elements. The antenna beam direction is steered in a second direction by switching on a second set of antenna elements.

Independent Claim 19 describes a spacecraft, including an antenna array system. The antenna array system includes a plurality of antenna elements organized in an array and configured to form a non-planar shaped antenna array surface, and switching circuitry configured to switch each of the plurality of antenna elements on or off based on control signals. The antenna beam direction is steered in a first direction by switching on a first set of antenna elements. The antenna beam direction is steered in a second direction by switching on a second set of antenna elements.

Rao, on the other hand, discloses an antenna which includes plurality of feed horns 42 which generate single beam 22, that has a phase distribution. *See* Rao, Abstract; paras. [0013] and [0020]; and Figure 5. Although the Office Action alleges that Rao discloses the aforementioned distinguishing features of the present invention, Applicants respectfully disagree. Specifically, while the present invention steers the antenna beam in a first direction and second direction by

switching on a first set of antenna elements and a second set of antenna elements, respectfully, Rao is seen to require three discrete antenna systems 30 (not just three antenna elements 42) in order to direct beams to three separate footprints 28, labeled A, B and C. *See* Rao, paras. [0014] and [0015]; and Figs. 2 and 3. Moreover, although feed network 36 is seen to filter and polarize frequencies entering each feed horn 42, nowhere is Rao seen to switch each of the plurality of antenna elements “on” or “off” based on control signals. Accordingly, amended independent Claims 1 and 19 are believed to be allowable over the applied art, whether considered individually or in combination.

The other rejected claims in the application are each dependent from the independent claims and are believed to be allowable over the applied reference for at least the same reasons. Because each dependent claim is deemed to define additional aspects of the invention, however, the individual consideration of each on its own merits is respectfully requested.

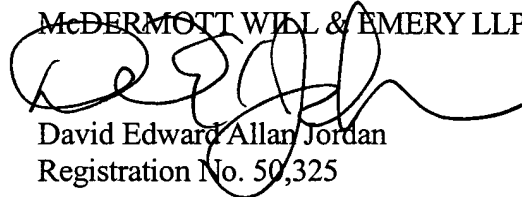
In view of the foregoing amendments and remarks, it is believed that the entire application is in condition for allowance, and such action is respectfully requested at the Examiner’s earliest convenience.

No.: 10/643,817

Applicants' undersigned attorney may be reached in our Orange County office by telephone at (949) 851-0633. All correspondence should continue to be directed to our address given below.

Respectfully submitted,

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